REMARKS

Claims 23-45 were pending as of the action mailed on June 1, 2006.

Claim 23 is being amended to correct a typographical error.

Reexamination and reconsideration of the action are requested in light of the foregoing amendments and the following remarks.

The Invention

The applicant does not accept the summary provided by the examiner in paragraph 3 of the detailed action. The claimed inventions are defined by the claims.

Section 103

Claims 23-26, 28, 29, 31-34, 36, 37, 39-41 and 45 were rejected as allegedly unpatentable over U.S. Patent Application No. 5,649,152 ("Ohran") in view of *File System Design for an NFS File Server Appliance* ("Hitz") in view U.S. Patent No. 5,867,733 ("Meyer").

The applicant agrees with the summary of the *Graham v. Deere* factors set forth in paragraph 6 of the detailed action. However, the applicant does not agree that the examiner has actually applied the factors. In particular, the examiner has failed to give the terms of the claims a proper construction, as the terms would be understood by someone of ordinary skill in the art at the time the application was filed. "The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Claim 23 – Ohran. The examiner rejected claim 23 stating that Ohran teaches a system substantially as claimed, comprising:

> b) copy logic (see disclosure that blocks are copied into the preservation memory when they are going to be changed by a write operation, col. 2, lines 55-58; see also col. 5, lines 48-53; see also step 212 in Figure 2)

The applicant disagrees. What the claim recites and what the cited portions of Ohran disclose are materially different.

The claim recites that the copy logic that can "generate and send one or more storage device commands to one or more storage devices for the source and target volumes to copy data from the source volume directly to the target volume."

The cited parts of Ohran do not disclose copying data to a target volume. Instead, they disclose copying data to "preservation memory". (Col. 2, lines 55-58; col. 5, lines 48-53 and step 212)

As the examiner correctly notes, the "blocks are copied into the preservation memory when they are going to be changed by a write operation." (Detailed action, paragraph 9b) The copy logic of the claim, on the other hand, is operable to copy all of the data in the range of bytes specified by the snapshot command, not merely the data the might be overwritten by a write command. Thus, where Ohran creates a virtual device (*see, e.g.*, step 204) whose data is stored partially in the mass storage system and partially in the preservation memory, the copy logic of the claims copies the entirety of the snapshot range to the target device. The target volume of the claim does not correspond to the preservation memory, because the target volume will always contain the entirety of the snapshot after the copy is complete, while the preservation memory will not.

The purpose of Ohran is to provide a static image of data stored on a mass storage system as it existed at a particular time. (Col. 2, lines 49-51) This is done by providing a virtual device that appears to be a mass storage device containing the static image. (Col. 2, lines 52-53) To create a snapshot on a real storage device, Ohran discloses copying the static image from the virtual device (i.e., from both the preservation memory and the real mass storage system) to a real device, and in particular, to a backup tape. (Col. 1, lines 20-26; col. 3, lines 3-5; col. 6, lines 4-7; col. 6, line 60 – col. 7, line 1; col. 7, lines 22-25; col. 7, lines 31-33) The logic of Ohran's figure 2 does not in fact create a complete snapshot of the source volume data range, as recited in the claims. Instead, that is done by a separate program or process that copies the virtual device, which may even be done on a computer separate from the one on which the virtual device was created. (*See, e.g.*, col. 7, lines 22-39)

It should be noted that the claim recites three volumes, the source volume, the target volume, and the snapshot volume. The snapshot data is stored in the snapshot volume, and this can be taken as corresponding, for present purposes, with the preservation memory of Ohran.

It should also be noted that the copy logic of the claims does not copy data to the snapshot volume – i.e., it does not take or copy snapshot data – rather, it copies data to the target volume. Thus, nothing that the copy logic of the claim does corresponds to the storing of data into the preservation memory.

The examiner also stated that Ohran teaches a system substantially as claimed, comprising:

> e) the system being operable to communicate with the replication manager to receive a copy command specifying the source volume and target volume (see disclosure of the copy command, col. 5, lines 48-53).

The applicant disagrees.

The copy command of Ohran (col. 5, lines 48-53) cited by the examiner does not correspond to the copy command of the claims. The cited passage describes step 212 of Ohran, which "places a copy of the block of data currently located at the mass storage write address in preservation memory." This is an operation that corresponds to the snapshot logic of the claim, not the copy logic, because it stores snapshot data, not target volume data.

The examiner also stated that Ohran teaches a system substantially as claimed, comprising:

> h) the copy logic being operable in response to receiving the copy command to generate and send one or more storage device commands to one or more storage devices for the source and target volumes to copy data from the source and target volumes to copy data from the source volume to the target volume, the copy logic using the snapshot map and the snapshot data to maintain coherency of the copied data (see disclosure in the Abstract; see detailed disclosure of this process at col. 5, line 48 through col. 6, line 30)

The part of Ohran that the examiner relies on reads in its entirety as follows.

> Returning to FIG. 2, step 212 is executed if there is not a block associated with the mass storage write address in preservation memory 106. Step 212

places a copy of the block of data currently located at the mass storage write address in preservation memory 106, updating block association memory 108 as necessary. It is important to note that step 212 will be executed at most once for each unique address on mass storage system 104, since the next time step 210 tests to see if there is a block in preservation memory 106 associated with that mass storage write address it will find the copy made by step 212. Because of this, preservation memory 106 will contain only copies of blocks as they were when the method was started.

In step 214, the data to be written by the mass storage write operation is written to the location on mass storage system 104 specified by the mass storage write address. This completes the steps for a mass storage write, and step 206 is reentered to wait for the next operation.

If the operation is a virtual device read, step 220 is entered. Again, a check is made to determine if a block associated with the virtual device read address is in preservation memory 106. If there is such a block, step 224 is executed. If not, step 222 is executed.

Step 222 returns the data from the block in mass storage system 104 specified by the virtual device read address as the result of the read operation. Step 224 returns the block from preservation memory 106 associated with the virtual address read address as the result of the read operation. This completes the steps for a virtual device read, and step 206 is reentered to wait for the next operation.

If the operation is a mass storage read, step 230 is entered, which returns the data from the block of mass storage system 104 specified by the mass storage read address as the result of the read operation. This completes the steps for a mass storage read, and step 206 is reentered to wait for the next operation.

It may be desirable to allow write operations to the virtual device, changing the image as specified by the write operations. For example, it may be necessary to write a different label or other control information on the virtual device image so the operating system can differentiate it from mass storage system 104.

If the operation is a virtual device write, step 240 is entered. Step 240 checks to see if the virtual device is read-only, and if it is step 242 is entered to return an appropriate error indication to the operating system or user.

> Step 244 checks to determine if a block associated with the virtual device write address is in preservation memory 106. If there is such a block, step 248 is executed. If not, step 246 is executed.

The examiner states that the copy logic "operable in response to receiving the copy command to generate and send one or more storage device commands to one or more storage devices for the source and target volumes to copy data from the source volume . . . to the target volume" is found in the just-quoted col. 5, line 48 – col. 6, line 40.

The applicant disagrees.

First, from a review of the passage on which the examiner relies, reproduced in its entirety above, it is clear that the examiner has failed to identify where in Ohran the receipt of a copy command is disclosed. This makes it difficult for the applicant to understand the examiner's interpretation of the claim language and the examiner's application of the claim language to Ohran. The examiner is reminded of the admonition of MPEP 706.02(j), which states:

> It is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply.

Second, the examiner has failed to take into account the difference between the snapshot volume and its snapshot data, on the one hand, and the target volume and its data copied from the source volume, on the other. The copying in Ohran that corresponds to the recited copying from the source to the target volumes is not described in the cite part of Ohran. Rather, it is described earlier and later in Ohran, when copying of the virtual device to a backup tape is described. The cited passage of Ohran does not in fact describe or suggest the operations of the copy logic recited in the claim.

The examiner is required to consider all of the words of the claims, and in the present case has failed to do so. "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 165 USPQ 494, 496 (CCPA 1970) (emphasis added).

Claim 23 – Hitz. To support the rejection of claim 23, the examiner states that Hitz teaches a system in which the snapshot operations are carried out in and managed by a storage device controller, citing the abstract and introduction (pages 4 and 5) of Hitz.

The applicant disagrees.

First, while the examiner implies that Ohran discloses all the operations recited in the claims, other than those the examiner finds in Meyer, this is not the case, as shown above.

Second, Hitz does not disclose a storage device controller, nor does Hitz purport to disclose a storage device controller.

Even a cursory reading of pages 4 and 5 of Hitz, on which the examiner relies, would make this clear.

On page 4 Hitz states that the paper (i.e., Hitz) describes a "file system." This file system is called WAFL, and is designed to work in an NFS appliance. Neither the appliance nor WAFL are described as a storage device controller, a device controller, or anything of the kind.

On page 5 Hitz states that a "new type of network appliance is the NFS file server appliance." (Emphasis added) It describes the requirements of a file system operating in an NFS appliance. It describes the design requirements and features of the WAFL file system.

The authors of Hitz describe WAFL as a file system. Among them, the authors' credentials include a BSE degree in computer science, a masters degree in computer engineering, a bachelors degree in computer science and applied mathematics, an associate professorship (a tenured position) in computer science, and a Ph.D. in computer science. The authors can therefore be relied on to know the difference between a device controller and a file system or file server. The authors consistently describe the subject of their paper as a file system for use in a network appliance file server. They describe neither the appliance nor the file system as a device controller. The examiner's insistence that Hitz describes a storage device controller is unsupportable. For this reason, it is insufficient to make out a *prima facie* case of obviousness. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). For at least this reason, the rejection should be withdrawn.

Moreover, the examiner's interpretation and application of the claim language to the Hitz and Ohran references lacks foundation and consistency. In justifying the combination of the two

references, the examiner states that the combination would "off-load the processing load for managing snapshots (as well as management of the file system itself) from the server to the storage device controller, thus improving performance on the server itself."

The network appliance described in Hitz is a file server. (Page 5 *et passim*) The WAFL file system on the server creates snapshots. (Page 6 *et passim*) The WAFL file system runs on the appliance. (Page 4 *et passim*) The examiner's statement that the combination of Ohran and Hitz would off-load this processing to the Hitz appliance makes no sense, because all the functions mentioned by the examiner are already performed on the Hitz appliance. The examiner's motivation to combine therefore has no factual basis and is a transparent rationalization of a hindsight reconstruction of the applicant's claimed inventions.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. *Uniroyal, Inc. v. Rudkin-Wilev Corp*., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc*., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert denied, 475 U.S. 1017 (1986); *ACS Hosp. Svs., Inc. v. Montefiore Hosp*., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima *facie case* of obviousness. *See, In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

For the additional reason that the examiner has failed to satisfy the foregoing legal requirements, the rejection should be withdrawn.

Claim 23 – Meyer. The examiner relies on Meyer to teach a system where data is transferred between a source and destination storage device without traversing a file server. The applicant agrees that Meyer teaches such a system.

The applicant also calls to the examiner's attention that Meyer, unlike Ohran and Hitz, actually does describe a device controller. (Title; Abstract; col. 4, lines 5-13; col. 5, lines 46-60) However, it is not a device controller that can perform the operations, or has the logic, recited in the applicant's claims.

The examiner has provided no motivation for a combination that would include the operations and logic of the claims into the device controller of Meyer; nor has the examiner shown how the teachings of the other references could be modified to arrive at the applicant's claimed inventions. For at least these reasons, the examiner has failed to make out a *prima facie* case of obviousness, and the rejection should be withdrawn.

Moreover, while the applicant and the examiner agree that Meyer teaches a system of direct device to device data transfer, that is not what the claims recites. Claim 23 recites that the copy logic copies the data directly while using the snapshot map and snapshot data to maintain coherency in the copied data. This feature is not taught or suggested by Meyer. The examiner has failed to state what modification the examiner would make to combine Meyer with either Hitz or Ohran, let alone show some justification for the modification. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (citation omitted). For each of these additional reasons, the examiner has failed to make out a *prima facie* case of obviousness, and the rejection should be withdrawn.

Similarly, the examiner has not shown how to make a combination of Meyer with Ohran so that direct copying of data while using a snapshot map and snapshot data, as recited in the claim, would occur. In Ohran, the copying to a target volume – which in Ohran would be a backup tape – occurs through a copying from a virtual device. The examiner has not shown how Meyer, which is directed to a direct transfer between to hardware devices, would be modified to perform a direct transfer from a virtual device. Nor has the examiner provided any motivation for making such a modification. For this reason as well, the examiner has failed to make out a *prima facie* case of obviousness, and the rejections should be withdrawn.

Claims 31, 39 and 40. The examiner rejected independent claims 31, 39 and 40 relying on the same application of Ohran, Hitz and Meyer to the claim language as the examiner applied to claim 23.

For the reasons set forth above in reference to claim 23, therefore, the examiner has failed to make out a *prima facie* case of obviousness and the rejection of claim 31 should be withdrawn.

Claims 24 and 32. The examiner rejected claims 24 and 32 stating that:

> Hitz et al. teaches a storage device controller and method wherein the storage device controller is a RAID controller (see section 1.0 Introduction, page 5, third paragraph).

As already explained at great length, Hitz does not teach or describe a device controller. What Hitz describes is a file system and file server appliance. What Hitz says about the file system (WAFL) on page 5 is that it supports RAID (third paragraph) and that the write-anywhere design of WAFL allows it to write to disk locations that minimize RAID's write performance penalty. Neither statement says or suggests that WAFL or the file server is a RAID controller. The examiner has provided no motivation for modifying the reference to teach a RAID controller that performs even the operations ascribed to Hitz. For at least this reason, the examiner has failed to meet his burden of making out a *prima facie* case of obviousness, and the rejections should be withdrawn.

Claims 26 and 34. The examiner rejected claims 26 and 34 stating that:

> Ohran et al. teaches a storage device controller and method wherein the replication manager is executed on a file server (see col. 6, lines 50-55).

The part of Ohran that the examiner relies on reads in its entirety as follows.

> The computer system running the method of the invention can also be used as a file server for client computers connected to it by a network or other means. As a file server, it can export its mass storage system, the virtual device created by the method, or both. Such a system is illustrated in FIG. 3.

Claims 27 and 35 were rejected as allegedly unpatentable over Ohran in view of Hitz in view U.S. Patent No. 5,867,733 ("Meyer") as applied to claims 23-26, 28, 29, 31-34, 36, 37, 39-41 and 45, and further in view of U.S. Patent No. 6,421,723 ("Tawil").

Claims 27 and 35. The examiner rejected claim 27 and 35 stating that:

> Ohran et al., Hitz et al. and Meyer teach a storage device controller and method substantially as claimed.
>
> None of Ohran et al., Hitz et al. nor Meyer explicitly teaches a storage device controller and method wherein the file server is connected to a storage area network switch and the file server communicates with the storage device controller through the storage are network switch.
>
> Tawil, however, teaches the use of a storage area network (see col. 1, lines 30-42).

The part of Tawil that the examiner relies on reads in its entirety as follows.

> Storage area networks offer centralized storage of data for increased efficiency and data handling. A properly implemented storage area network provides data access reliability and availability, unobtrusive capacity expansion such as with the addition of data storage devices, improved data backup and recovery, and performance that is competitive with local data storage. Many of the advantages of storage area networks are described in greater detail in an August 1998 Dell computer whitepaper entitled "Storage Area Network Technology" published at www.dell.com/r&d/whitepapers/wpsan.html and a February 1999 Dell computer whitepaper entitled "Storage Area Network Solutions" published at www.dell.com/r&d/wp/spring99/sansol.html.

The examiner's only stated grounds for rejecting claim 27 and 35 is that "Tawil, however, teaches the use of a storage area network." This is insufficient as a basis for the rejection, because the claims actually recite more, namely, that "the file server communicates with the storage device controller through the storage area network switch." The examiner has not shown where this feature is taught or suggested. The examiner has therefore failed to meet his burden of making out a *prima facie* case of obviousness, and the rejections should be withdrawn.

Claims 30 and 38 were rejected as allegedly unpatentable over Ohran in view of Hitz in view Meyer as applied to claims 23-26, 28, 29, 31-34, 36, 37, 39-41 and 45, and further in view of U.S. Patent No. 6,205,479 ("Dulai").

Claims 30 and 38. The examiner rejected claim 30 and 38 stating that:

> Ohran et al., Hitz et al. and Meyer teach a storage device controller and method substantially as claimed.
>
> None of Ohran et al., Hitz et al. nor Meyer explicitly reaches a storage device controller and method wherein the controller is operable to send the one or more storage device commands by using one of an in-band protocol or an out-of-band protocol.
>
> Dulai et al., however, teaches a storage device controller and method wherein the controller is operable to send the one or more storage device commands by using one or an in-band protocol or an out-of-band protocol (see disclosure of the use of an in-band protocol, claims 18 and 21).

The part of Dulai that the examiner relies on reads in its entirety as follows.

> 18. The method of claim 17, wherein the packet network is the Internet and the client control protocol is an in-band protocol transmitted using transmission control protocol/Internet protocol.
> 21. The method of claim 20, wherein the communications network is the Internet and the client control protocol is an in-band protocol transmitted using transmission control protocol/Internet protocol.

The cited passage does not support the examiner's assert that "Dulai . . . teaches a storage device controller." In fact, Dulai does not teach a storage device controller. Dulai teaches a "client controller". *See*, *e.g.*, claim 1, from which claim 18 ultimately depends, with is directed to a "method using a client controller to control a client's access to use a communications network, the client accessing the client controller through a service provider independent of the client controller." Similarly, claim 20, the base claim of claim 21, recites a "method using a client controller to monitor a client's access to use a communications network, the client accessing the client controller through a service provider independent of the client controller." Clearly, a client is not a storage device. Thus, a client controller is not a storage device controller. For this additional reason, the rejection of the claims should be withdrawn.

Examiner's Response to Arguments

As to Hitz, the examiner stated:

> 28. Regarding the applicant's argument that Hitz fails to disclose the claimed storage device controller, the examiner respectfully disagrees:
>
> As argued previously by the Applicants during prosecution of the parent application 09/375,819, in their response filed 30 June 2003, on page 7, "A file system is different from a storage device controller. File systems are computer-program products that process file system requests. In contrast, a storage device controller, as is well understood in the art, is a device that operates below the functional level at which a file system operates. For example, *a file system processes file system request and deals with files whereas a storage device controller processes data block requests and deals with data blocks.*" (emphasis added).
>
> The examiner's position during prosecution of these applications has been that the system disclosed by the Hitz et al. reference is analogous to the claimed storage device controller, since the system deals with data on the block level, below the level of a conventional file system (see, for instance, Figures 3 and 4; see also disclosure associated with Figure 3(c) on page 10, last paragraph, and disclosure associated with Figure 4 on page 11, last paragraph, both illustrating the fact that the system is managing data on the block level, since they disclose actions taken when a disk block [as opposed to a file] is modified).

The examiner's statement that "the system disclosed by [Hitz] is analogous to the claimed device controller" (emphasis added) effectively concedes the applicant's point. If it is analogous to a device controller, the system of Hitz would have to be modified to meet the limitations of the claims. The examiner has not described any such modifications, and therefore has provided no motivation for making the modifications. The examiner has therefore failed to meet his burden of making out a *prima facie* case of obviousness, and the rejections should be withdrawn.

The examiner' statement that "the [Hitz] system deals with data on the block level, below the level of a conventional file system" is incorrect. The blocks Hitz illustrates are file blocks. The small print in Figure 4 next to the illustrated file blocks says things like "Inode File Block", "Regular File Indirect Block", and "Regular File Data Block", and the roots of the chains of blocks are "inodes", which are, as is known to all those of skill in the art, data structures each

holding information about one file in a Unix-like file system. Thus, the blocks illustrated in Hitz are not below the level of the file system; and the portions of the reference the examiner relies on do not actually support the examiner's conclusion.

The examiner has essentially concluded that because the system of Hitz manages data in blocks, it is a device controller. The conclusion does not follow. At some level, every file system has to deal with units of data, which conveniently may be the same size as the blocks written on the mass storage devices on which the files are written. By the examiner's reasoning, every computer that includes a file system a device controller. But that conclusion is absurd, so the examiner's reasoning must be rejected.

The examiner's initial statement relies on an argument made by the applicant in the prosecution of a parent to the present application. That argument, like the language of the claims, was written to be understood by one of ordinary skill in the art. Someone having such skill would have understood that the data blocks and data block requests mentioned in the applicant's argument were blocks and requests defined on the device level and not on the file level. *See*, *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-137 (Fed. Cir. 2005) (en banc) (the construction of claim language determines what the language means to one of ordinary skill in the art at the time of the invention in light of the application).

As to Meyer, the examiner stated:

> 29. Regarding the applicant's argument that Meyer fails to disclose all of the features of the claimed copy logic, the examiner stated that:
>
> these features are disclosed by the other references, as stated in the rejection of record. The **Meyer et al.** reference is relied upon merely for its disclosure that data can be copied directly from one mass storage device, such as a hard disk drive, to another storage device, without processor [i.e., file server] intervention.
>
> One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1980).

As the applicant has shown, the other references do not in fact disclose all the features of the claimed copy logic. Therefore, asserting that Meyer does not disclose the features absent

from the other references is not an attack on Meyer, it is an attack on the sufficiency of the examiner's *prima facie* case.

The abstract fact that data can be copied directly from one mass storage device to another storage device does constitute any teaching or suggestion as to how a device actually taught in Meyer should be modified to make it work in combination with Ohran and Hitz to achieve the claimed invention, or what motivation would have existed to make such a modification. What the examiner has done is to make a hindsight reconstruction of the applicant's claimed inventions, without even making the references fit together to make the reconstruction. Thus, even taken on its own terms, the articulated basis for the rejection fails to make a *prima facie* case and the rejection should be withdrawn.

Conclusion

For each and all of the foregoing reasons, the applicant submits that all the claims are in condition for allowance.

By responding in the foregoing remarks only to particular positions taken by the examiner, the applicant does not acquiesce with other positions that have not been explicitly addressed. In addition, the applicant's arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 14 Aug 06

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